

ANIMAL CONTROL MANAGEMENT PLAN

PARKER RIVER NATIONAL WILDLIFE REFUGE
NEWBURYPORT, MASSACHUSETTS

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I. INTRODUCTION

The Parker River National Wildlife Refuge was established in 1942 as part of the National Wildlife Refuge System and is managed specifically for protection of wildlife and wildlife habitat. The refuge includes the southern two-thirds of Plum Island, a nine mile coastal barrier island, which forms and protects the important Essex county salt marshes along the northern Massachusetts shore and is one of the few natural barrier beach-dune-salt marsh complexes left on the Northeast Coast.

The purchase of lands on Plum Island and adjacent wetlands for the refuge was approved by the Migratory Bird Conservation Commission under the authority of the Migratory Bird Conservation Act. The refuge is composed of 4662 acres. Habitat includes barrier beach (818 acres), salt marsh and mud flats (2994), brush (400), three impoundments (265), grassland (88), and forest (11 acres). An additional 86 acres is used for administration.

The refuge was originally established to protect and preserve migratory waterfowl, especially black ducks and Canada geese. The three impoundments were created with man-made dikes to provide additional habitat and many species would not occur on the refuge without them. The original mandate has broadened, along with the general trend of the NWRS, to protection of all species indigenous to the area.

The refuge supports a wide variety of wildlife including 270 species of birds. Table 1 lists the ground nesting bird species that have been found on the refuge within the past ten years. Some of these species are of particular importance because of their status (Table 2). Aggressive management is in progress for two beach nesting species, the piping plover and least tern. Black ducks are continuing to decline, along with other ducks, and are a Species of Concern. It is believed some of the marshbird species are declining in numbers on the refuge. The nest success of many of these species is reduced by predation.

The refuge boundary falls within four municipalities: Newburyport, Newbury, Rowley, and Ipswich. The settled northern third of Plum Island has a population of 3000 year-round residents that swells to 5000 in the summer. Parker River NWR is located 35 miles northeast of Boston and is in a tourist area known for a variety of recreational opportunities. The refuge experiences some of the highest public use in the region, receiving approximately 400,000 visits annually for wildlife observation, beachcombing and sunbathing, hunting and fishing, environmental education, photography, and other activities.

II. REFUGE OBJECTIVES

The general refuge objectives, parallel to that of the National Wildlife Refuge System(2 RM 1.4), are to preserve and restore threatened and endangered species, to preserve and enhance the migratory bird resource, to preserve a diversity of fauna and flora, to provide an understanding of the resource, and to provide high quality recreational experiences to the public to the extent it is compatible with refuge objectives.

More specific refuge goals, as outlined in the Master Plan (1986) and Waterfowl Management Evaluation (1989), support NWRS, Atlantic Flyway, and regional resource objectives, and are as follows:

- o Achieve the maximum number of migratory bird species indigenous to the refuge biotype consistent with other important management needs and habitat limitations.
- o Contribute to the Migratory Bird Program goals for wintering black duck populations. National goals are based on a three-year moving average of winter surveys.
- o Achieve a duck breeding population at or above the 1975-1980 average, based on five key species: mallard, black, gadwall, green-winged teal, and blue-winged teal.
- o Manage waterfowl and habitat so as to achieve an annual production of 300-700 black ducks and 675-1600 young of other duck species combined.
- o Maintain a resident Canada goose population that does not exceed the 1975-1980 average population of 200-300 birds.
- o Protect and enhance breeding and maintenance habitat for non-game birds, especially those with decreasing populations.
 - Marsh and Waterbirds: 450 young
 - Rail and Snipe : 350 young
 - Least Tern : 100 young
 - Piping Plover : 2 chicks fledged per pair
- o Manage refuge lands for a diversity of mammal and non-migratory species at optimum population levels by providing a wide range of habitats at various successional levels.
- o Manage, preserve and maintain the existing Research Natural Area.

- o Promote environmental education and interpretive programs to broaden public awareness of, and appreciation for, the natural and managed environments of the refuge.
- o Provide visitors with a safe and enjoyable recreational experience without conflicting with the basic refuge purpose.

III. CONFORMANCE WITH STATUTORY AUTHORITY

The Service policy (7 RM 14.2) is to engage in the control of wildlife within the NWRS to assure wildlife and fish populations consistent with the optimum management of refuge habitat.

Control programs must be designed to maintain environmental quality and to conserve and protect the nation's wildlife resources. They will be based on a broad systematic approach utilizing all available information. Reduction methods are chosen on the basis of effectiveness, cost, and minimal ecological disruption.

No animal will be subject to control unless the following conditions are met:

- o The animal represents a threat to human health and well-being, private property, the acceptable level of damage by the pest has been exceeded, or State and local governments have designated the animal as noxious.
- o The animal is detrimental to primary refuge objectives: and
- o The planned control program will not conflict with attainment of refuge objectives or the purposes for which the refuge is managed.

When population levels of certain wildlife species or behavior patterns of specific individuals at Parker River reach the point where they conflict with the Refuge Objectives described above, they will be considered incompatible with the purpose for which the refuge was established.

All animal control efforts are to be conducted in accordance with State laws and regulations. The Massachusetts Division of Fisheries and Wildlife is to be consulted since target control species are resident wildlife and under their jurisdiction. Parker River NWR currently has a State permit for using predator exclosures to protect beach nesting shorebirds. There is also a valid depredation permit for the taking of red fox, striped skunk, raccoon, and opossum by means of live trapping, shooting, or asphyxiation; and a permit for the capture and euthanization of breeding mute swans and their progeny. These permits are to be kept current. An application will be made to authorize chemical euthanasia.

IV. ASSESSMENT

The following is a description of the problems or potential problems related to individual wildlife species considered in this Plan.

Striped Skunk

The striped skunk is a known predator of ground nesting birds, particularly pheasants, least terns, piping plovers and waterfowl. Predation is considered one of the major limiting factors of piping plover productivity (U.S. Fish and Wildlife Service 1988) and nest destruction by skunks has been documented at nearby sites in Massachusetts (MacIvor et al 1987, Rimmer and Deblinger 1990). As a result of the increased emphasis on this species due to its recent Federal listing as threatened, a dummy nest experiment was conducted on the refuge in 1986. Nest scrapes containing quail (Coturnix spp.) eggs were created to simulate nests of piping plovers. Of the fifteen nests, over half were destroyed; at least four by skunks. Results appear in Table 2. An active plover nest on the refuge beach was destroyed by a skunk in 1990. Exclosures erected to encircle nests have been found to be effective in reducing nest predation (Rimmer and Deblinger 1990).

Nest predation by skunks has been even more significant on least tern success. Tern nests have not been protected by predator exclosures in the past at Parker River. It is estimated that over 50 nests, or more than one third of the total nest attempts, were predated by skunks in 1990. Nest predation is the major cause of the poor success for terns in 1990. Nest predation has been important in the past and it is felt that this predation has reduced tern production significantly in recent years. Although an attempt will be made to encircle one colony in 1991 with fencing, many nests will be unprotected and at risk.

The refuge skunk population has been consistently high. Refuge law enforcement officers who frequently patrol at night (during the period when skunks are most active) report them as abundant. During their winter denning period skunks tend to concentrate around buildings and man-made structures (particularly Camp Sea Haven). During summer and fall they spread out over the island. At night they frequently travel along the dune edges and tide wrack in search of food. A high incidence of skunk tracks and sightings on the beach, and the disproportionate level of skunk predation on dummy nests suggest an imminent threat to piping plovers and other beach nesting birds. The abnormally high skunk population on the refuge represents a continuous threat to all other ground nesting birds, including waterfowl. Skunk removal has been effective in increasing duck nest success (Duebbert and Lokemoen 1980, Greenwood 1986).

Red Fox

Over the last ten years, the red fox population on the refuge has fluctuated dramatically. In 1975, the population suffered a complete or near complete die-off due to sarcoptic mange. By 1977 the foxes had recovered to an estimated fifteen individuals. In November of 1978, a fox with sarcoptic mange was destroyed. In late winter/early spring of 1978/79, more sightings of fox exhibiting signs of mange were made, and several dead fox were found. No fox were seen until the fall of 1980 and numbers remained low through 1982. The population has steadily increased since then. In 1986 and 1987, fourteen and five fox were counted respectively by helicopter during a daylight deer survey. By the spring of 1990, increased sign indicated numbers were rising.

Foxes are known to be important predators of piping plover and least tern eggs in many areas. A plover nest was destroyed by fox on the refuge in 1987 and at Sandy Point in 1986. Their presence may inhibit these birds from nesting, as was the case for a pair of plovers in 1988. Fox are also significant predators of nesting waterfowl (7 RM 3 Ex.2, Sargent et al 1984) and removal has resulted in higher duck nesting success (Duebbert and Lokemoen 1980). Black duck remains have been found outside fox dens on the refuge. Refuge personnel banding waterfowl reported as many as 18 ducks killed in traps by foxes and raccoons in one year. They also prey on pheasants and other ground nesting birds.

Because it is a barrier island, the topography of Parker River Refuge serves to confine the foxes' food source to a smaller area, facilitating easier capture and location of prey. The fox population is not at the level of the skunk population but their mobility and location in the food chain, make them equally important threats to ground nesting birds.

Raccoons

Raccoons, although less abundant than foxes and skunks in the recent past, are also present on the refuge and apparently increasing in numbers. They were most likely at first attracted to the island by the garbage and refuse associated with human inhabitation. Eventually they find their way onto the refuge. Raccoons are known predators of ground nesting birds, and have also been recorded preying on trapped waterfowl. They constitute a serious threat to waterfowl and shorebird productivity (Fritzell 1978).

Opossums

Opossums are relatively new residents of the refuge. The refuge population is still small but could grow in time if unchecked. Like the above-mentioned carnivores, opossums are predators of

ground nesting birds. A piping plover nest with a predator enclosure was destroyed by an opossum in 1989, and several least tern nests at the Sea Haven colony met a similar end in 1990.

Woodchuck

The woodchuck's propensity for burrowing has made it an undesirable species. Parker River Refuge supports a substantial population of chucks. Burrows in upland areas are a hazard to the operation of farm equipment, and can cause structural damage to dikes.

Beaver

Beaver have the potential to cause more damage or alteration to refuge habitat than almost any other mammal. Occasional flooding, damming and felling of trees have been observed. When these activities disrupt, alter, or interfere with specific objectives of the refuge, the beaver will be removed. Beaver can also carry giardiasis (Giardia lamblia), a parasitic infection which can be transmitted to humans.

Muskrat

Musk rats can cause considerable habitat destruction when population levels become excessive. Cattail marshes can be completely wiped out during "eat outs". Muskrat populations are usually naturally controlled by density dependent factors. Although the refuge population has not yet reached critical levels, the potential remains. Musk rats frequently cause damage by burrowing into dikes. It is still uncertain, but muskrats are also suspected of being carriers of Giardia.

White-tailed Deer

The deer population on Parker River Refuge recently reached high numbers in the mid-1980's and has been decreasing since then due to annual organized hunts.

Helicopter survey results for the past six years are as follows:

	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Survey 1	119	100	129	82	38	27
Survey 2	104	94	110	89		

The recommended winter population range for deer on the refuge is 15-30 animals. Excessively high populations often result in an overall reduction in the health of individuals, higher relative mortality, and the threat of a population crash. Deer struggling through the winter can also cause extensive habitat destruction by

overbrowsing. When deer begin feeding on plant foods with little or no nutritive value, as has been observed on Parker River Refuge, it is obvious that preferred food sources have been exhausted.

Preferred plant species for deer are also important foods for other wildlife and extensive overbrowsing has resulted in a reduction in available food and cover.

Deer are an intermediate host of Lyme disease. More deer also means more deer ticks (Ixodes dammini) and a greater potential for incidence of Lyme disease. This parasitic infection can be debilitating to humans. The incidence of transmission increases exponentially as the deer population increases. In the neighboring Crane Reservation, Lyme disease has already reached epidemic proportions and it is known that deer from the Reservation and the Refuge do intermingle.

As food becomes scarce, deer begin to lose some of their natural fear of humans and accept food handouts. Gradually they become accustomed to humans and this leads to a higher level of deer/human interactions. This could lead to a greater chance of injury, especially during the rut when deer are more aggressive. In 1986, a woman was bitten on the hand while feeding a deer.

A higher incidence of deer poaching, correlated with the increase in deer numbers, has also been observed on the refuge. This could pose considerable problems for refuge law enforcement as well as public safety in the future.

Rabbit

The cottontail rabbit population on Parker River Refuge has fluctuated dramatically over the years, indirectly correlated with the fox population. In general, the rabbit population tends to be controlled by natural cycles of predation and competition.

Rodents

Small rodents (Microtus spp.) (Peromyscus spp.) tend to be more of a nuisance, but could potentially cause damage to refuge property and buildings if not controlled.

Gulls

Two large gull species, herring and great black-backed, are common on the refuge. If established in number, they are effective predators of eggs and chicks of species such as piping plovers and least terns. Breeding gulls nest earlier, are more aggressive, and can take over potential plover and tern nesting areas.

Swans

Mute swans, an exotic, have been increasing in Massachusetts. The most recent estimate of the state population is 1000 birds (French, pers. comm.). These swans have been reported to drive away native waterfowl and degrade a pond's plant life. There have been 1-2 breeding pairs in recent years on refuge impoundments or adjacent marsh and negative impacts have been noted. A pair nesting in the North Pool in 1990 occupied a large territory in the relatively small impoundment, supplanting native ducks.

Reptiles

Snapping turtles are common in freshwater impoundments on Parker River Refuge. A high turtle population could seriously impact waterfowl production on the refuge. The stomach of one turtle trapped in 1986 was found to contain 2 ducklings, a red-winged blackbird and muskrat parts. The remains of a black duck partially eaten by a turtle was recovered from the North Pool in 1990.

Feral and Domestic Animals

The presence of feral and free-roaming domestic animals poses a serious threat to wildlife species on the refuge. The residential northern third of Plum Island has no leash law. Dogs and cats are predators of ground nesting birds and small mammals. Their presence on the refuge is inconsistent with general and specific refuge objectives and goals, and they should be removed whenever possible.

V. CONTROL OBJECTIVES

The objectives of animal control on the Parker River Refuge are:

1. To contribute to the widest possible natural diversity of indigenous fish and wildlife and habitat types (7 RM 1.1), and to provide the public with quality wildlife-oriented recreational experiences.
2. To maintain population levels of wildlife species which:
 - a) ensure a minimal amount of destruction to refuge and surrounding habitat,
 - b) are compatible with refuge objectives including those which may involve habitat manipulation,
 - c) are at a level where predation is not excessive.
3. To contribute to the attainment of national migratory bird (7 RM 3), mammal, and non-migratory bird (7 RM 4) and endangered species (7 RM 2) goals or objectives.

4. To maintain healthy populations of ground nesting bird species and thus prevent any resident or migratory species from becoming threatened, and to protect threatened species from further decline.
5. To ensure that conflicts between endangered/threatened species and other wildlife management or public use programs are resolved in favor of the endangered/threatened species (7 RM 2.2). Considerations will also be given to the protection of species identified by the State as endangered threatened or of special concern (7 RM 2.1).
6. To minimize wildlife damage to physical facilities (e.g. dikes and water control structures) and to facilitate safe operation of farm equipment and vehicles (7 RM 14).
7. To minimize the occurrence of high population densities of wildlife species which have the potential to transmit contagious diseases to humans, other mammals, or domestic animals (7 RM 14.2) (includes control of small rodent populations in refuge facilities and buildings).

VI. EQUIPMENT

Additional information can be found in Rondeau and Piehls (1989). For equipment used in plover predator exclosures, see station 1991 Piping Plover Recommendations and Rimmer and Deblinger (1990).

A. Vehicles

1. A pickup with an open back, or
2. A four-wheel ATV

B. Traps

1. Box type live traps.
 - 10 each-7X7x24 inch
 - 1 each-10X12X32 inch
2. 6 Turtle traps(wire,net)
3. 6 Snap traps for rodents
4. 20 metal identification tags for marking traps.

C. Baits

1. 80 cans of fish variety catfood or tuna fish packed in oil.
2. 10 dozen chicken eggs.
3. Fried chicken (optional)

D. Euthanasia

1. 200 gas cartridges.
2. T-61 euthanasia solution. Available through licensed veterinarians.
3. 6cc disposable plastic syringes with 20 gauge 1 1/2 inch long hypodermic needles.
4. Black plastic electrical tape for attaching tape to injector stick.
5. Label information for euthanasia solution. Include address of medical facilities for emergency situations.
6. Drug box, to store and secure items 2-5. The box must be locked and stored in a safe place when not in use.
7. A four-foot long injector stick.
8. A disposable "sharps" collector for disposal of hypodermic needles.
9. A long-barreled .22 caliber rim fire rifle, with case.
10. .22 shorts for dispatching animals in traps.
11. .22 longs for shooting free ranging predators.

E. Miscellaneous Trapping Supplies

1. One 30- or 50-gallon barrel cut in half for cleaning and preparing traps.
2. Animal handling and personal protection equipment.
3. Flagging, garbage bags, and animal odor neutralizer.

F. Data Collection

1. Route map for marking trap locations.
2. Field notebook.
3. End of year tally report forms.

VII. ACTIONA. Inventory

Wildlife species will be inventoried in accordance with this station's Wildlife Inventory Plan. Optional inventory procedures are as follows:

- O. Conduct a scent post index or other systematic survey.
- O. Conduct annual aerial counts of red foxes and muskrat lodges in conjunction with aerial deer survey (Procedure 9, Wildlife Inventory Plan).
- O. Conduct red fox, striped skunk and raccoon counts in conjunction with Nighttime Spotlight Deer Survey (Procedure 8, Wildlife Inventory Plan).

- O Conduct nocturnal counts of red fox, skunk and raccoons in conjunction with routine law enforcement patrols.
- O Locate active red fox dens in conjunction with dead deer survey/search.
- O Conduct counts of red fox, skunk and raccoon through evaluation of sign.

B. Pretrapping Preparation

Both new and old traps should be washed each year with hot, soapy water. They should be rinsed and allowed to dry outdoors. A site for disposal of carcasses should be located, prepared, and secured.

C. Control Methods

Plover predator exclosures are described in Rimmer and Deblinger (1990).

Live-trapping procedures for skunk, raccoon, and opossum are described by Rondeau and Piehl (1989). If possible, traps will be placed in the shade. They will be checked first thing in the morning. Non-target animals captured in live traps will be released safely. Trapped mammals will be humanely euthanized. Use of T-61 euthanasia solution is the preferred method to dispatch a target mammal. When this is not possible, animals will be shot discreetly and judiciously with a small caliber rifle. Personnel should wear protective gear when handling and transporting to disposal sites.

Striped Skunk

Live trapping will be used to control skunks. Trapping will be concentrated in March and April to remove skunks from beach nesting areas of plovers and terns. Additional trapping will be done after April if tracks are observed in the vicinity of nesting areas. The use of gas cartridges, when approved by EPA, will also be used to fumigate active skunk dens in and adjacent to plover and waterfowl nesting areas.

Traps will be placed in and around buildings, along travel lanes and other areas of concentration. Trapped skunks will be euthanized humanely. Skunks observed after hours in plover/tern nesting areas by Law Enforcement personnel will be euthanized by small caliber firearms. Discretion will be up to refuge personnel in terms of times, specific methods and locations. These two methods combined can only be expected to hold down the skunk population at or near acceptable levels.

Raccoon

When pest individuals are located, or evidence of wildlife destruction is recorded, the problem animal will be live-trapped and humanely euthanized. Raccoons observed after hours by Law Enforcement personnel in beach and impoundment nesting areas will be euthanized with firearms. Gas cartridges, when approved by EPA, will also be used to fumigate active coon dens in and adjacent to plover and waterfowl nesting areas.

Opossum

When an opossum is seen or its tracks observed during the plover and tern nesting season on the beach or dunes, it will be live-trapped and humanely euthanized. Opossums observed after hours by Law Enforcement personnel in these areas will be euthanized with firearms. Gas cartridges will be used to fumigate active opossum dens in and adjacent to plover and waterfowl nests.

Red Fox

Predator control for plover protection will concentrate on removing foxes found in and adjacent to the beach area. Control for waterfowl protection will concentrate on the impoundments and salt marsh. Control is directed toward target individuals, not the species in general.

The refuge currently has a valid depredation permit for taking red foxes. The most effective method for removing red fox is the use of leg hold traps. The refuge will apply for State Fish and Game approval to use padded leg hold traps to remove problem fox in the area of nesting plovers and waterfowl. As this method is not automatically approved by the State, alternative methods must be used until approval for padded leg hold traps can be obtained. The methods proposed are: 1) the use of predator calls and shooting during hours when the refuge is closed to public use, and during the breeding season (February and March); 2) the use of gas cartridges, when approved by EPA, in dens during the denning season (January through May); and 3) live-trapping and removal. These methods combined, (without the use of leg-hold traps), cannot be expected to control foxes at an acceptable level. They are also time intensive and require a certain level of skill. Recent research efforts conducted by Tufts University on Sandy Neck in Barnstable have shown that foxes tend to be very individualistic in their feeding techniques (P. Auger pers. comm.).

Woodchucks

Woodchucks seen in areas where burrows are detrimental to the safe operation of equipment and to dikes, may be removed by

discreet and judicious use of small caliber firearms. Burrows located in these areas will be periodically gassed (preferred).

Beaver

Individual beaver, found to be altering habitat in a detrimental way, will be euthanized with small caliber firearms or live-trapped with Hancock traps and relocated. All beaver killed or trapped should be tested for Giardia.

Muskrat

If muskrat populations reach a level where they become destructive to habitat, the refuge will consider implementing a trapping program consistent with State regulations, and Service policy.

White-tailed Deer

The refuge white-tailed deer population will be controlled by implementation of a public hunt described in detail in the Refuge Management Plan, Big Game Hunt.

Rodents

Live traps and snap traps will be set for rodents in buildings where damage or potential health hazards are observed.

Swans

Mute swans breeding or attempting to breed on refuge lands and/or their eggs or progeny will be euthanized at the discretion of the Manager. Embryos will be euthanized by shaking egg contents. The preference for euthanasia of adults and young shall be capture and injection of T-61 or similar compound. Secondary methods shall be spinal cord separation with emasculatomes or shooting at close range to the brain with small caliber firearms.

Reptiles

Due to the effectiveness of turtle traps, the size of the turtle population, and the potential impact of turtles on waterfowl production, trapping of snapping turtles should be conducted to the maximum possible level within manpower constraints. Turtle live traps will be set and tended in conjunction with the refuge YCC program, from June to August. Traps will be checked in the morning and turtles will be humanely euthanized. Age, sex, weight, stomach contents, and size will be recorded, as well as the location.

Feral and Domestic Animals

Feral and free-roaming domestic animals will be removed from the refuge. The most effective method for controlling feral cats is live-trapping or shooting. Reasonable efforts will be made to capture free-roaming dogs. In the case of licensed dogs, local Dog Control Officers will be contacted; animals impounded; and owners will then be held responsible. In accordance with 50 CFR 28.43, dogs and cats observed in the act of harassing wildlife may be destroyed. Non-lethal means will be exhausted. Unlicensed dogs, if captured, can be turned over to local or State agencies for disposal.

C. Record Keeping

Detailed record keeping is an important part of a successful animal control plan. Field Data will be entered onto a standard "Trap Data Sheet", (Figure 1). One sheet should be used for each trap site. Sex, age, and fate are entered under 'Activity Data'. Non-target animals are recorded as released. Target animals are recorded as killed, and the method should also be recorded. Results will be summarized and evaluated annually.

Results from systematic surveys of predator populations will be incorporated into the annual evaluation.

Waterfowl and shorebird productivity will be assessed in conjunction with any control program to help in evaluating plan efficacy.

Annual reports of activities under appropriate state and federal permits will be completed and distributed.

VII. ESTIMATED COSTS

A technician or trapper, under the supervision of the Biologist or Assistant Refuge Manager, will spend 3-4 hours per day for 10 weeks in the spring. The following is a rough estimate of expenses for the predator control program. Vehicle(s) costs were not included in this estimate.

Labor	\$ 1,200.00
Durables	
Traps	150.00
Initial equipment & supplies	50.00
Recurring	
Expendable supplies	400.00
Fuel	300.00
Miscellaneous	100.00
Total	\$ 2,200.00

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APPENDIX

Table 1. Ground Nesting Birds of Parker River NWR

Common Name	Relative Abundance
Pied-billed Grebe	uncommon
Green-backed Heron	uncommon
Least Bittern	uncommon
Canada Goose	common
Mallard	common
Black Duck	common
Gadwall	common
Pintail	uncommon
Green-winged Teal	uncommon
Blue-winged Teal	common
Northern Shoveler	occasional
Ruddy Duck	uncommon
Bobwhite	occasional
Ring-necked Pheasant	uncommon
Virginia Rail	uncommon
King Rail	occasional
Common Moorhen	uncommon
Piping Plover	uncommon
Killdeer	common
Spotted Sandpiper	uncommon
Common Tern	abundant
Least Tern	common
Mourning Dove	common
Horned Lark	uncommon
Eastern Meadowlark	uncommon
Bobolink	common
Savannah Sparrow	uncommon
Sharp-tailed Sparrow	common
Seaside Sparrow	uncommon
Song Sparrow	abundant

ANIMAL CONTROL

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PARKER RIVER

NWR

Table 2. Status of some ground nesting birds of Parker River NWR.

Species	Status		Potential Threats
	State	Federal	
Least Tern	SC		
Common Tern	SC		Fox, Skunk, Raccoon, Opossum,
Northern Harrier	T		Crow, Large Gulls, Black-
Short-eared owl	E		Crowned Night Heron.
Least Bittern	T		
American Bittern	SC		
Pied-billed Grebe	T		
Piping Plover	T	T	
Black Duck		SC	

SC- Species of Special Concern

T- Threatened

E- Endangered

Table 3. Results of Dummy Nest Study.

Nest #	Result
<u>Treatment 1</u> Natural Nests: eggs placed in nest with extended pole; checked every 3-4 days from distance.	
1	nest not found
2	nest destroyed - skunk
3	nest destroyed - skunk
4	nest destroyed - bird
5	nest destroyed - bird
<u>Treatment 2</u> Intensively Visited Nests: eggs placed in nests with hands; check closely daily.	
1	nest covered by sand
2	2 eggs removed
3	nest destroyed - unknown
4	2 eggs destroyed - unknown
5	still intact
<u>Treatment 3</u> Control Nests: eggs placed in nests with hands; checked closely every 3-4 days.	
1	nest destroyed - skunk
2	nest destroyed - skunk
3	nest not found
4	nest destroyed - human
5	still intact

ANIMAL CONTROL

MANAGEMENT PLAN

PARKER RIVER

NWR

Figure 1. Trap Data Sheet

Parker River NWR
TRAP DATA SHEET

Name: _____

Trap Type: _____ Trap No. _____

Location: _____

_____ Date Placed

Date

Results

_____ Date Removed

_____ Total Trap Days

RESEARCH/MANAGEMENT STUDY PROPOSAL

PARKER RIVER NATIONAL WILDLIFE REFUGE
Newburyport, Massachusetts

1. TITLE: PREDATION ON BEACH NESTING BIRDS
2. PROJECT NUMBER: PKR-RMS-86-20
3. OBJECTIVES: QUANTIFY THE AMOUNT OF PREDATION ON NESTING BIRDS AT PARKER RIVER NATIONAL WILDLIFE REFUGE. OBTAIN DATA ON FEASIBILITY OF ANIMAL CONTROL FOR PROTECTION OF NESTING BIRDS. IDENTIFY THE SPECIES MOST INVOLVED IN THE PREDATION OF NESTS.
4. JUSTIFICATION: THE PIPING PLOVER HAS BEEN PLACED ON THE SERVICE'S THREATENED SPECIES LIST. THIS BIRD NESTS ON THE BEACH AT PARKER RIVER NWR AND HAS EXPERIENCED SOME SUCCESS IN RAISING YOUNG. HOWEVER, THE POPULATIONS OF RED FOX AND STRIPED SKUNK HAVE BEEN ON THE INCREASE AND THEIR INCREASED PRESENCE ON THE BEACH HAS BEEN NOTED. IT IS BELIEVED THAT THESE SPECIES ARE IMPACTING THE NESTING PLOVERS AND OTHER THREATENED SPECIES. THIS STUDY WILL IDENTIFY THE AMOUNT OF PREDATION THAT MAY BE OCCURRING AND THE SPECIES MOST LIKELY RESPONSIBLE FOR THE PREDATION.

5. PROCEDURE:A. Methods and Materials:

Dummy nest procedures: 15 nests, 50 yards apart, independent of habitat, but in Piping Plover characteristic habitat. Three different treatments; 1 treatment per 5 nests. Three to four eggs per scrape. Quail eggs will be used in this study.

TREATMENT 1- "Natural Nests": Apply to 5 nests. Place eggs in scrapes with extended pole- at least 15 feet away. "Do Not Handle Eggs with Ungloved Hands". Place eggs with narrow point inward, all narrow points together. Check nest every 3-4 days. Keep good record of visits. Never walk up to the nest, if possible, check for tracks with binoculars. If nest was preyed on, look for and note any tracks in area and distance from scrape. Describe tracks in detail!! Collect any eggs or egg-shell fragments and label them.

TREATMENT 2- "Intensively Visited Nests": Apply to 5 nests. Place eggs in scrape with hands in same position as #1 above. Visit scrapes as often as possible (min. once a day). Walk up to nests, simulate trapping one time per nest by placing trap over nest and then picking it back up. Walk up to nest and note any tracks or disturbance. Collect fragments and eggs as #1 above.

TREATMENT 3- "Control": Apply to five nests. Place eggs in nest with hands. Visit nests every 3-4 days. Simulate trapping once per nest. Note any tracks and disturbances as in #1 above.

Run treatment for 2 weeks or until scrapes are all destroyed- whichever comes first. If possible, repeat experiment with new eggs.

Scrapes will be placed in series, treatment 1 then 2 then 3, then repeated until all 15 scrapes are placed. Numbering system will be 1-1,1-2,1-3, etc.; 2-1,2-2,2-3, etc. All scrapes will be marked with a numbered blue flag at least 20 feet away from the eggs in the cardinal direction indicated on a map of the treatment area. Scrapes will be placed at 50 yard intervals.

If possible, any predation will be documented by photo as well as by collection of egg fragments and tracks in the area.

These procedures are the same as Laurie McIver uses in her study on Cape Cod and Monomy NWR.

B. Results: Data will be shown in tabular form and charts showing the loss of scrapes per treatment and loss over time. Where possible a table of predators per treatment and overall predator losses for the entire test area will be built.

C. Interpretation: If it is determined that a significant number of nests are being lost to predation, then an animal control program will need to be instituted to assist the nesting birds, i.e. Piping Plovers and Least Terns.

6. COOPERATIONS: None

7. RESPONSIBILITY: USFWS, STAFF PARKER RIVER NWR, J.F. MILTON

8. COST: MATERIALS ON HAND
EQUIPMENT ON HAND
MAN YEARS FY86 .06 COST \$1,000

9. SCHEDULE: 7 AUGUST 86 TO 20 AUGUST 86 FIELD WORK
21 AUGUST 86 TO 15 SEPTEMBER 86 WRITE UP
31 SEPTEMBER COMPLETION

10. REPORTS: AT END OF STUDY 31 SEPTEMBER 1986

11. PUBLICATIONS: NONE EXPECTED

SUBMITTED BY:

J. J. Muth

DATE

8/7/86

Endorsement:

DATE

REFUGEE MANAGER APPROVAL:

John D. Ellis

DATE

8/7/86

REGIONAL OFFICE CONCURRENCE/APPROVAL:

Thomas J. McAndrews

DATE:

8-14-86

Regional Office Disposition:

CC: RF-WO
WR-WO
SE-RO
RF-N(B)

HOW TO RUN SCENT STATION SURVEY LINES

A scent station consists of a 3-foot circle of sifted dirt with a scented plaster disk placed at its center. A scent station line consists of 10 of these stations, located 0.3 mile apart, placed on a continuous route along a secondary road. Each line is thus 2.7 miles long (0.3 miles X 9 intervals between stations = 2.7 miles). A line is run by setting up the 10 stations one day, leaving them overnight, then reading animal tracks in the sifted dirt the next day.

SELECTING SURVEY LINE LOCATIONS. Survey lines should be spaced at least 2 miles apart; the farther the better. Lines should be placed in typical habitat through areas you feel contain average wildlife populations. Don't select areas containing very low or high numbers, since the purpose of the survey is to measure average levels of abundance. Try to locate lines on lands that aren't likely to change ownership or land use so that comparable lines can be repeated there in following years. Select your routes along unpaved secondary or ranch roads where animals would normally travel. If you trap in the area, don't use roads near your traps. Once you select your routes, mark the exact locations on a county, topographic, or other detailed map, and show which is the starting end of each (station 1). Assign a name and sequence number to each line, and mark these on the map too. (If you're repeating a line from previous years, give it the same name as before.) With each kit is also a form to fill out giving information about the area where the line is run. When the survey is finished, send in the map and completed area information form along with the data form for each line.

SETTING UP THE SCENT STATIONS. Stations are numbered from 1 to 10 along the route. They should be alternated on either side of the road as the line is set up, with station 1 on the left side, station 2 on the right, station 3 on the left, etc. (If you're repeating a line from previous years, start numbering at the same end of the route as you did before.) Locate the 10 stations 0.3 mile apart; this is easy if you use your vehicle odometer to follow the mileage.

Place each station near the road but far enough off so that it won't be run over by vehicles. Pick a more or less flat spot and mark a circle on it 3 feet in diameter. Measure (don't estimate) the circle size; it helps to use a 3-foot hoop made of stiff wire or something similar. Clear the circle of rocks, clumps of grass, etc.; sometimes you'll need a hoe or shovel to scalp off the vegetation, lift rocks, or level the site.

Then sift dirt evenly over the circle to a depth of about 1/4 inch. If conditions are right, you can use dirt present at the site. A wooden frame 12" to 18" on a side and a bottom of 1/8" hardware cloth makes a useful sifter. Where loose, dry dirt is available, a piece of window screen that can be laid over the hardware cloth will sift fine, dry dust, ideal for reading tracks. In some areas it will be hard to find suitable dirt at scent station sites and much time will be saved if you carry dirt with you. Results are best with fine dust, about the consistency of flour. Failing this, you can use coarser dirt if it's screened, or sand if it's fine enough. Once the circle is covered with sifted dirt, place a scented plaster disk in the center to complete the station. Before you leave the site, if you put a marker such as a large rock or stick near the road edge, it will help you find the station from your vehicle tomorrow.

HANDLING THE SCENT DISKS. Each kit includes a glass tube containing 11 scented disks (enough for one survey line, plus a spare). The tubes come with tight stoppers and shouldn't be opened until they're needed. To control odor, they should be stored in cold or cool conditions, preferably inside another container (glass is best, since the odor can seep through plastic). The scent disks are plaster disks soaked in a mixture of organic acids that not only smell bad but are corrosive. Contact with them can remove paint, dissolve some plastics, and cause chemical burns to skin, so they should be handled carefully. Each kit includes disposable gloves and tweezers to help get them out of the tube and onto the scent stations without letting them touch skin or other surfaces.

As tracks are read the next day, the disks should be picked up from the stations and then disposed of along with the used tubes, gloves, etc. (They can be buried, taken to a dump, or discarded with household garbage.) The success of the survey depends on the odor being new to the animals, so we ask that all disks left be destroyed, and not used for more surveys in the same area or for other purposes like trapping. However, if a disk gets carried off from a station, don't worry about leaving it, since it will dissolve with a few rains.

If the scent accidentally gets on something and won't come off, contact Wildlife Services, Inc. for odor removal products.

COMPLETING THE DATA FORM. Each kit contains a blank data form to record animal visits to each station, plus completed forms

as examples of how to fill one out. For each survey line, complete the information at the top of a blank form (using the same line name and number you used on the map and area information form), then take the form with you and fill in the data for each station as you stop to examine it. Don't try to do this from your vehicle; get out, circle around, and look closely.

The first column on the data form is for station condition, operable or inoperable. If something happened to the station so that it couldn't take tracks or all tracks were destroyed - for example, if it was washed out by rain or trampled by livestock - record it as "inoperable" by marking a minus in the Station Condition column. Don't record animal visits for any station marked as inoperable; if you can read even one track, mark the station as operable (plus) so the visit can be counted (you can note problems, such as partially operable stations, under Comments). If more than 4 stations on one survey line are inoperable, that run is considered a wipe-out (see below for what to do in that case).

The other columns on the form are for recording animal visits. All that's actually recorded is absence (no mark) or presence (a "1", regardless of the number or size of tracks of that species at that station). The most common species have been given their own columns, but you should list all visitors whose tracks you can identify. When you can, name the exact species that made the track (either because you can tell it by its track or because you know it's the only one like that in your area). However, DON'T GUESS on track identification. If you're not reasonably sure, don't mark a "1" in a column or list the name (at least, not without a question mark) in the Other Species list. Likewise, don't record tracks that fall completely outside the 3-foot circle. Even if you're experienced, it helps to take a good track book with you, such as Murie's "Field Guide to Animal Tracks" (Peterson Field Guide series). If you have a good, clear track you just can't identify, you may want to photograph it in case someone else can (put down a pencil or some such object nearby to show the size).

Below the columns on the form is a place for comments. If something unusual happened that might affect interpretation of the data, note it here.

When the survey is finished, promptly send the completed data forms, area information

forms, and maps for all your survey lines back to your survey coordinator.

WIPE-OUTS. To be counted, survey lines must be read the day after they were set out and must show at least 6 stations operable. Lines that don't qualify are considered wipe-outs and should be run again. To repeat a line, you can reconstruct the original stations or, if necessary, relocate the route and start over. Scent disks can be reused if they seem serviceable.

A 1-week period in mid-September is designated each year for running the survey nationwide, but a 2-week grace period is allowed beyond the survey week for lines that have been delayed or have to be repeated. Therefore, if bad weather is threatening, it's usually better to wait rather than risk setting a line that may be wiped out.

If you need quick replacements for forms or kits to repeat wiped-out surveys, phone your survey coordinator or Wildlife Services, Inc.

THE KIT. Each kit consists of:

- 1 instruction sheet
- 1 sample sheet of completed area information and data forms
- 1 sample route map
- 1 blank area information form
- 1 blank data form
- 1 glass tube containing 11 scent disks
- 1 pair of disposable plastic gloves
- 1 pair of disposable tweezers

CHECK LIST. Things to take with you when setting out and reading scent station lines:

- One kit for each line (be sure to bring the data forms)
- Pencil/pen
- Extra paper for notes
- Measure for station circles: 3-foot wire hoop or yardstick
- Sifter for dirt at the sites (with optional window screen insert)
- Presifted dirt or fine sand for difficult sites
- Shovel
- Hoe, pick, or both
- Track guide(s)
- Camera
- Water for washing

Wildlife Services, Inc.
P.O. Box 876
Fredericksburg, Texas 78624
(512) 997-4454

SCENT STATION SURVEY - DATA FORM

Route name _____ No. _____ County _____ State _____

Observer _____ Observer's organization _____

Date stations were set: _____

Date stations were read: _____

Was this same route run here last year? _____

CONDITIONS LAST NIGHT (circle one of each):

WEATHER:

WIND:

BAROMETRIC PRESSURE:

- (1) Clear
(2) Cloudy (no rain)
(3) Showers
(4) Rain
(5) Snow

- (1) Calm
(2) Light wind
(3) Moderate wind
(4) Strong wind

- (1) Rising
(2) Falling
(3) Steady

OVERNIGHT LOW TEMPERATURE: _____

Scent station number	Station condition	Visits by species							List other species visiting station
		Coyote	Rac-coon	Skunk	Badger	Red fox	Gray fox	Dog	
1 (L)									
2 (R)									
3 (L)									
4 (R)									
5 (L)									
6 (R)									
7 (L)									
8 (R)									
9 (L)									
10 (R)									

Comments: _____

INSTRUCTIONS:

Station condition: + = Operable (Tracks, if present, could be read; disk present or absent.)
- = Inoperable (Surface so disturbed that no tracks could be made or read.)

Species visits: If station shows one or more tracks of listed species (coyote, raccoon, etc.), mark "1" in appropriate column. At right, list all other species making identifiable tracks.

Comments: Note track ID problems or anything unusual that might affect data interpretation. Immediately after the survey, attach this Data Form to its corresponding Area Information Form and forward both, along with the area map showing your route(s), to your Survey Coordinator.

Wildlife Services, Inc. — (512) 997-4454
P.O. Box 876, Fredericksburg, Texas 78624

SCENT STATION SURVEY - AREA INFORMATION FORM

Route name _____ No. _____ County _____ State _____

Observer _____ Observer's organization _____

ate survey scheduled _____ Check here if map showing route is attached _____

Questions A-C refer to the area immediately surrounding the survey route, question E to the mor
general area, such as the county or part of the county:

A. LAND SURFACE (enter number): Primary _____ Secondary _____

1. Flat.	4. Mountains	8. Shore of lake or ocean
2. Irregular or rolling	5. Canyons, badlands, breaks	9. Wetlands or marsh
3. Hilly: foothills, buttes, mesas, etc.	6. Sand dunes, sand hills	10. Other _____
	7. River or stream bed	

B. VEGETATION (enter number): Primary _____ Secondary _____

1. Conifer forest	6. Grassland	13. Agricultural crops
2. Broadleaf or deciduous forest	7. Mixed forest/grassland	14. Mixed crops/forest
3. Mixed conifer/broadleaf forest	8. Mixed shrubs/grassland	15. Mixed crops/shrubs
4. Shrubs or brush	9. Wetland vegetation	16. Mixed crops/grassland
5. Mixed forest/shrubs	10. Mixed wetland/forest	17. Sparse desert vegetation
	11. Mixed wetland/shrubs	18. Other _____
	12. Mixed wetland/grassland	

C. LAND USE (enter number): Primary _____ Secondary _____

1. Farming: mainly raising crops	7. Public land/timber production (including national & state forests)
2. Farming: mainly raising animals	8. Public land/recreation & preservation (including refuges, parks, wilderness, game preserves)
3. Range: active livestock grazing	9. Military
4. Occasional grazing or no use	10. Other _____
5. Mining or quarrying	
6. Public land/grazing (including BLM, National Grasslands, etc.)	

D. SURVEY ROAD (circle numbers that apply):

(1) Paved road	(5) Full public access	(8) Heavy traffic
(2) Unpaved improved road	(6) Controlled public access	(9) Moderate traffic
(3) Rough trail, usable by vehicles	(7) Little or no public access	(10) Little or no traffic
(4) Foot path, game trail, etc.		

E. PREDATOR CONTROL IN GENERAL AREA (answer if you know):

Primary target species: _____

Primary methods used (circle numbers that apply):

(1) Aerial hunting	(3) Traps/snares	(5) Denning
(2) Shooting	(4) M-44's	(6) Other _____

Amount of control achieved (circle one):

(1) Substantial	(2) Moderate	(3) Minor	(4) Little or none
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F. COMMENTS: _____

PARKER RIVER NATIONAL WILDLIFE REFUGE

APPENDIX 3

UNITED STATES
DEPARTMENT OF THE INTERIOR

ESSEX COUNTY, MASSACHUSETTS

UNITED STATES
FISH AND WILDLIFE SERVICE

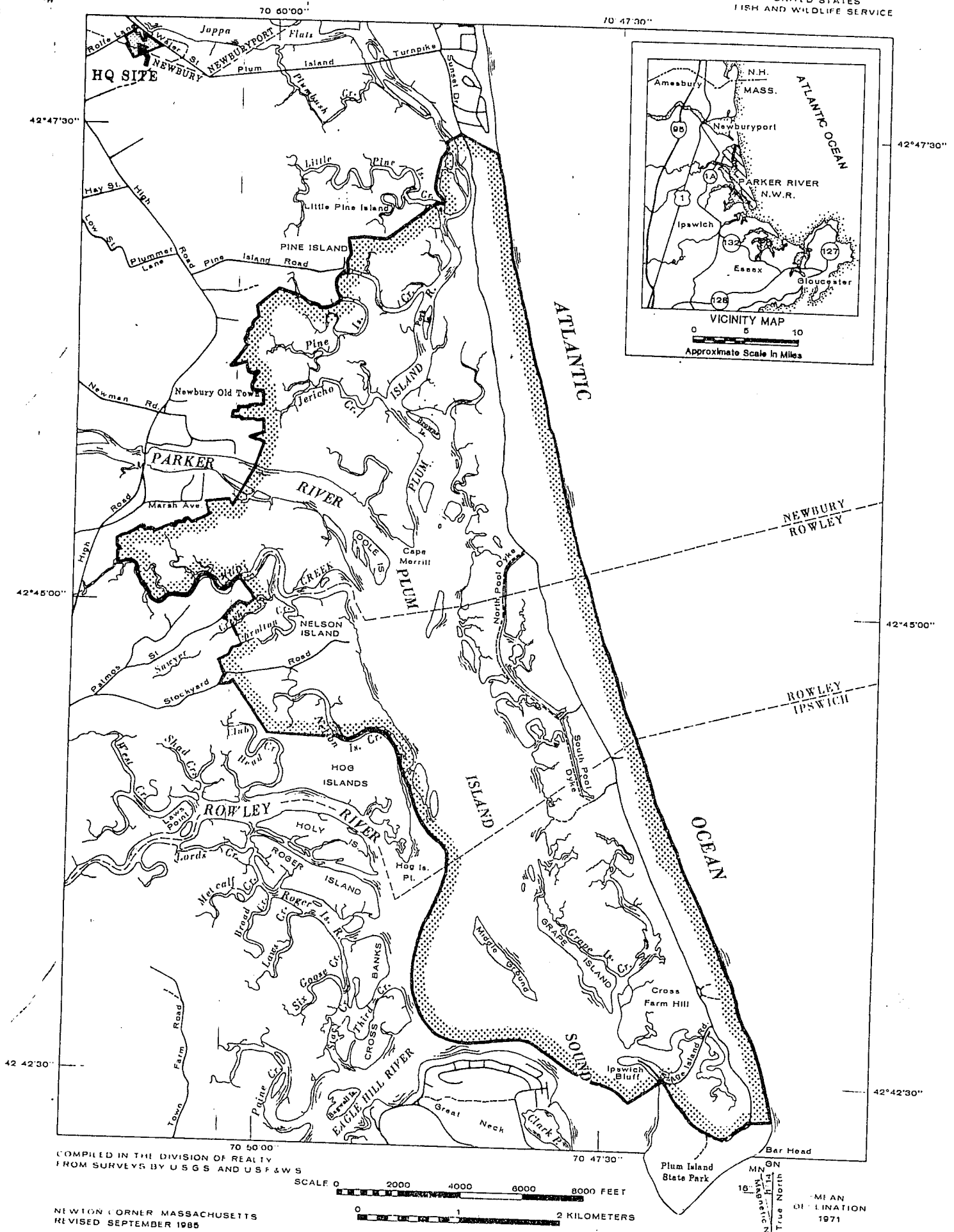


Table 1. Status of some ground nesting birds of Parker River NWR.

Species	Status		Potential Threats
	State	Federal	
Least tern	SC		
Common tern	SC		
Northern harrier	T		Fox, Skunk, Raccoon, Opossum, Crow
Short-eared owl	E		
Least bittern	T		
American bittern	SC		
Pied-billed grebe	T		
Piping plover	T	T	
Black duck		sc	
SC- Species of Special Concern			
T- Threatened			
E- Endangered			

Table 2. Results of Dummy Nest Study.

Nest #	Result
<u>Treatment 1</u>	
1	nest not found
2	nest destroyed-skunk
3	nest destroyed-skunk
4	nest destroyed-bird
5	nest destroyed-bird
<u>Treatment 2</u>	
1	nest covered by sand
2	2 eggs removed
3	nest destroyed-unknown
4	2 eggs destroyed unknown
5	still intact
<u>Treatment 3</u>	
1	nest destroyed-skunk
2	nest destroyed-skunk
3	nest not found
4	nest destroyed-human
5	still intact

Table 3 Ground Nesting Birds of Parker River NWR

Common Name	Relative Abundance
Pied-billed Grebe	uncommon
Green-backed Heron	uncommon
Black-crowned Night-heron	common
Least Bittern	uncommon
Canada Goose	common
Black Duck	common
Gadwall	common
Pintail	uncommon
Green-winged Teal	uncommon
Blue-winged Teal	common
Northern Shoveler	occasional
Wood Duck	uncommon
Ruddy Duck	uncommon
Bobwhite	occasional
Ring-necked Pheasant	uncommon
Virginia Rail	uncommon
King Rail	occasional
Common Moorhen	common
Piping Plover	uncommon
Killdeer	common
Spotted Sandpiper	uncommon
Common Tern	abundant
Least Tern	common
Herring Gull	abundant
Mourning Dove	common
Horned Lark	uncommon
Eastern Meadowlark	uncommon
Bobolink	common
Savannah Sparrow	uncommon
Sharp-tailed Sparrow	common
Seaside Sparrow	uncommon
Song Sparrow	abundant

§ 28.41

Subpart D—Impoundment Procedures**§ 28.41 Impoundment of abandoned property.**

Any property abandoned or left unattended without authority on any national wildlife refuge for a period in excess of 72 hours is subject to removal. The expense of the removal shall be borne by the person owning or claiming ownership of the property. Such property is subject to sale or other disposal after 3 months, in accordance with section 203m of the Federal Property and Administrative Services Act of 1959, as amended (40 U.S.C. 484m), and regulations issued thereunder. Former owners may apply within 3 years for reimbursement for such property, subject to disposal and storage costs and similar expenses, upon sufficient proof of ownership.

§ 28.42 Impounding of domestic animals.

(a) Any animal trespassing on the lands of any national wildlife refuge may be impounded and disposed of in accordance with State statutes insofar as they may be applicable. In the absence of such State statutes, the animals shall be disposed of in accordance with this section.

(b) If the owner is known, prompt written notice of the impounding will be served in person with written receipt obtained or delivery by certified mail with return receipt requested. In the event of his failure to remove the impounded animal within five (5) days from receipt of such notice, it will be sold or otherwise disposed of as prescribed in this section.

(c) If the owner is unknown, no disposition of the animal shall be made until at least fifteen (15) days have elapsed from the date of a legal notice of the impounding has been posted at the county courthouse and 15 days after the second notice published in a newspaper in general circulation in the county in which the trespass took place.

(d) The notice shall state when and where the animal was impounded and shall describe it by brand or earmark or distinguishing marks or by other reasonable identification. The notice shall specify the time and place the animal will be offered at public sale to

the highest bidder, in the event it is not claimed or redeemed. The notice shall reserve the right of the official conducting the sale to reject any and all bids so received.

(e) Prior to such sale, the owner may redeem the animal by submitting proof of ownership and paying all expenses of the United States for, capturing, impounding, advertising, care, forage, and damage claims.

(f) If an animal impounded under this section is offered at public sale and no bid is received or if the highest bid received is an amount less than the claim of the United States, the animal may be sold at private sale for the highest amount obtainable, or be condemned and destroyed or converted to the use of the United States. Upon the sale of any animal in accordance with this section, the buyer shall be issued a certificate of sale.

(g) In determining the claim of the Federal Government in all livestock trespass cases on national wildlife refuges, the value of forage consumed shall be computed at the commercial unit rate prevailing in the locality for that class of livestock. In addition, the claim shall include damages to national wildlife refuge property injured or destroyed, and all the related expenses incurred in the impounding, caring for and disposing of the animal. The salary of Service employees for the time spent in and about the investigations, reports, and settlement or prosecution of the case shall be prorated in computing the expense. Payment of claims due the United States shall be made by certified check or postal money order payable to the U.S. Fish and Wildlife Service.

§ 28.43 Destruction of dogs and cats.

Dogs and cats running at large on a national wildlife refuge and observed by an authorized official in the act of killing, injuring, harassing or molesting humans or wildlife may be disposed of in the interest of public safety and protection of the wildlife.